TDWG - Deliverable A: Coordination Protocols

Statement of Work (DRAFT)

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This document outlines the statement of work (SOW) for Deliverable A – Coordination Protocols, including descriptions of the deliverable, work packages, timelines, dependencies, and resources for executing the deliverable. This SOW will inform the TDWG work plan to end of 2024 and will build on related work conducted as part of the TDWG since the beginning of 2022.

1. Description of Deliverable

This deliverable will detail transmission-distribution (T-D) coordination protocols under the Total Distribution System Operator (T-DSO) and Dual Participation (DP-DSO) models. To support both transmission and distribution level reliability, protocols are needed to better integrate distributed energy resources and aggregators (DER(A)) in the IESO's wholesale market and system operations as well as in distribution networks. The Local Distribution Companies (LDCs), DER(A) participants, and the IESO will need to take coordinated actions and share data in a timely manner to ensure there is sufficient awareness (e.g., with respect to outages, limits on DER(A), and dispatch of DER(A), etc.) among the parties.

The T-D coordination protocols will need to detail the operational actions to be taken and information to be shared by the parties, ensuring the effective and reliable operation of the transmission and distribution systems and the DER(A) as they participate in the wholesale market and as they may provide services to the distribution system as non-wires alternative (NWA) solutions[1]. The protocols will consider and address cases where there is a host and an embedded distributor downstream of the T-D interface for the purposes of visibility and reliability. However, the protocols being developed will not consider a DER "tri participation" model (where DER would provide services to the embedded LDC, host LDC, and wholesale level).

The protocols are expected to be implementation-ready in the sense that they outline sufficient detail for LDCs, DER(A), and IESO to understand the impact to their operations and changes to tools/processes that will be needed and for the IESO to develop market rules/manuals.

[1] Distribution-level NWAs involve using DER(A) as solutions that defer or avoid the need for conventional distribution infrastructure upgrades due to load growth or other factors. While NWAs are the distribution-level service in focus for this scope, it is acknowledged that a variety of other distribution-level services exist.

To be comprehensive, the deliverable will outline protocols for the following scenarios:

1. DER(A) providing wholesale services as per the IESO Market Vision Project
2. DER(A) providing services to the distribution system, utilizing DER(A) as distribution NWA
3. DER(A) that, if permitted, provide both wholesale and distribution system services
4. DERs that are not actively participating in any distribution system or wholesale system services

The final Deliverable will be submitted to the TDWG as a report that details the T-D coordination protocols under the different models, including background on market and outage processes, clear explanation for how the protocols address operational reliability, and next steps for implementing the protocols.

There are a few constraints and/or limitations for this deliverable:

- Operational protocols only: The protocols address operational system and market coordination in (near) real-time. Planning and capacity investment timeframes and processes are out of scope. However, it is important to note that operational reliability also requires that there is coordination in the planning timeframe (including capacity investment). Additionally, this deliverable will not address settlement or other commercial issues.
- Market renewal processes: The IESO's Market Renewal Program (MRP) is modernizing the wholesale market and the T-D coordination protocols must integrate with the new processes.

The development of the Deliverable will build on past work and key reference documents:

- DER Market Vision Project (MVP): MVP seeks to introduce new participation models for DER(A) in IESO's wholesale market by 2026/2027, including enabling new approaches to aggregation.
- Market Renewal Program (MRP): In 2025, MRP will introduce modernized wholesale market processes, including a new Day-Ahead Market (DAM) and renewed Real-Time Market (RTM).
- IESO's DP-DSO Nov 2022 protocol: IESO staff presented a draft concept-level protocol for T-D coordination under the DP-DSO model in the DAM, RTM, and outage/override processes.
- EPRI DER Scenarios & Modeling Study: The study defines a set of grid services and scenarios, details coordination steps under the DP-DSO and T-DSO models, presents modeling and simulation results for conditions applicable to Ontario.
- NYISO Draft Aggregation Manual: NYISO, utilities, and stakeholders have developed a draft manual for aggregator participation in NYISO markets, including operational coordination.

2. Deliverable Lead & Sub-Groups

The IESO serves as the lead for the deliverable. In this capacity, IESO holds the primary responsibility for ensuring the quality and timely completion of all associated deliverables. A sub-group has been established to provide support and expertise for this deliverable. The sub-group consisting of representatives from:

- Essex Powerlines
- Hydro One

- Alectra Utilities

The IESO expects to share initial outlines and early drafts of individual work packages, provide periodic updates on work package progress, and offer early review and feedback opportunities to the sub-group. Members of the sub-group are also expected to allocate some time for periodic consultations, allowing IESO staff to seek insights and feedback, particularly on issues related to distribution system operations. The IESO may request that a sub-group member take on a bigger task, including holding the pen on a work package. Sub-group members will have the option of accepting or declining the request, considering their staffing, resources, or other considerations.

3. Work Packages

The deliverable will be broken down into work packages with distinct activities and sub-deliverables as outlined in Table 1 below. The description of the work packages should provide details of purpose, activities, approaches, and the expected outputs. The table also identifies the responsibilities and roles (including specialized subject matter expertise) of the deliverable lead or any sub-group members for executing the work packages.

Table 1: Work packages descriptions and roles/responsibilities

No	Name	Detailed Description	Roles & Responsibilities	Output
1	IESO T-D reliability considerations	IESO to describe considerations related to T-D coordination that impact bulk electric system operational reliability, e.g., including IESO functions, reliability standards, observability requirements, etc.	- IESO: conducts analysis and develops presentation - Sub-group provide reviews and consultations	Presentation deck
2	LDC T-D reliability considerations	LDC to describe considerations related to T-D coordination that impact distribution system operational reliability, e.g., including distribution operations, reliability standards, observability requirements, etc.	- TBD LDC conducts analysis and develops presentation - IESO and sub-group members provide reviews and consultations	Presentation deck
3	Draft coordination protocols: service stacking for T-DSO and DP-DSO models	Draw from IESO's Nov 2022 DP-DSO protocol presentation and EPRI's DER Scenarios & Modeling Study to outline T-DSO and DP-DSO protocols for scenario '3. DER(A) that, if permitted, provide both wholesale and distribution system services.' The format of the protocols will be consistent with the Nov 2022 IESO presentation and the EPRI study.	- IESO conducts analysis and drafts memorandum - Sub-group provide reviews and consultations	Memorandum

4	Draft coordination protocols: other scenarios for all models	Outline T-DSO and DP-DSO protocols for scenarios: '1. DER(A) providing wholesale services as per the IESO Market Vision Project', '2. DER(A) providing services to the distribution system, utilizing DER(A) as distribution NWA', and '4. DERs that are not actively participating in any services. Format of protocols will be consistent with reference documents.	- IESO conducts analysis and drafts memorandum - Sub-group members provide reviews and consultations	Memorandum
5	Draft complete report + feedback & responses appendix	A complete draft report will be provided, outlining the reliability considerations driving the approach to the protocol and detailing the T-D protocols under the T-DSO and DP-DSO models for each of the 4 scenarios described above. The report will also include an appendix containing a feedback and response document, summarizing the feedback received from the TDWG throughout the development of the protocols.	- IESO conducts analysis and drafts report - Sub-group: provide reviews and consultations	Draft Report
6	Final complete report – coordination protocols	Final report, reflecting final TDWG feedback, and with IESO cover letter prepended.	- IESO finalizes report	Final Report

4. Timelines, Dependencies, Resources and Other Specifics

Table 2 outlines the expected timeframe for each of the work packages described above. It also details dependencies for each work package on other work packages, deliverables in the TDWG workplan or external factors that may impact timelines, including any mitigation strategies.

Table 2: Work package expected timeline and dependencies

No	Name	Expected Timeline	Dependencies	Resources	Other Specifics
1	IESO T-D reliability considerations	Q4 2023	N/A	1 IESO FTE 0.1 sub-group FTE	N/A
2	LDC T-D reliability considerations	Q4 2023	N/A	0.25 IESO FTE TBD sub-group FTE	Work package will inform deliverable B1. Functional Assessment
3	Draft coordination protocols: service stacking for T-DSO and DP-DSO models	Q1 2024	N/A	1 IESO FTE 0.1 sub-group FTE	N/A
4	Draft coordination protocols: other scenarios for all models	Q2 2024	N/A	1 IESO FTE 0.1 sub-group FTE	N/A
5	Draft complete report + feedback & responses appendix	Q3 2024	N/A	1 IESO FTE 0.1 sub-group FTE	N/A
6	Final complete report – coordination protocols	Q4 2024	N/A	1 IESO FTE 0.1 sub-group FTE	N/A